UTAH DIVISION OF AIR QUALITY

Northern Wasatch Front Ozone Inventory Preparation Plan

MAY 2021

UTAH DEPARTMENT *of* ENVIRONMENTAL QUALITY
AIR QUALITY

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UTAH DIVISION OF AIR QUALITY - NORTHERN WASATCH FRONT OZONE NONATTAINMENT AREA INVENTORY PREPARATION PLAN

1. INTRODUCTION

On October 26, 2015, the Environmental Protection Agency (EPA) promulgated revisions to the National Ambient Air Quality Standards (NAAQS) for ground level ozone. The EPA strengthened the ozone primary and secondary NAAQS from 75 ppb to 70 ppb, based on the three-year average of the annual 4th highest daily eight-hour average concentration (40 CFR §50 Appendix U). On August 3, 2018, EPA designated three ozone nonattainment areas (NAAs) in Utah including the Uinta Basin, the Northern Wasatch Front (NWF), and the Southern Wasatch Front (83 FR 25776, "Additional Air Quality Designations for the 2015 Ozone National Ambient Air Quality Standards"; Final Rule, August 3, 2018). See Figure 1 maps of Utah's three NAAs. Utah's NWF NAA includes Salt Lake and Davis Counties as well as portions of Tooele and Weber Counties (Figure 1). All three areas in Utah are currently classified as marginal based on the 2014-2016 design value and other data. Tropospheric ozone production is a year-round phenomenon, although it is most common in the summer months due to the greater intensity of heat and solar radiation observed in these months. Since Utah's Uinta Basin is a uniquely wintertime ozone phenomena, independent inventories have been compiled for the Wasatch Front and the Uinta Basin NAAs.

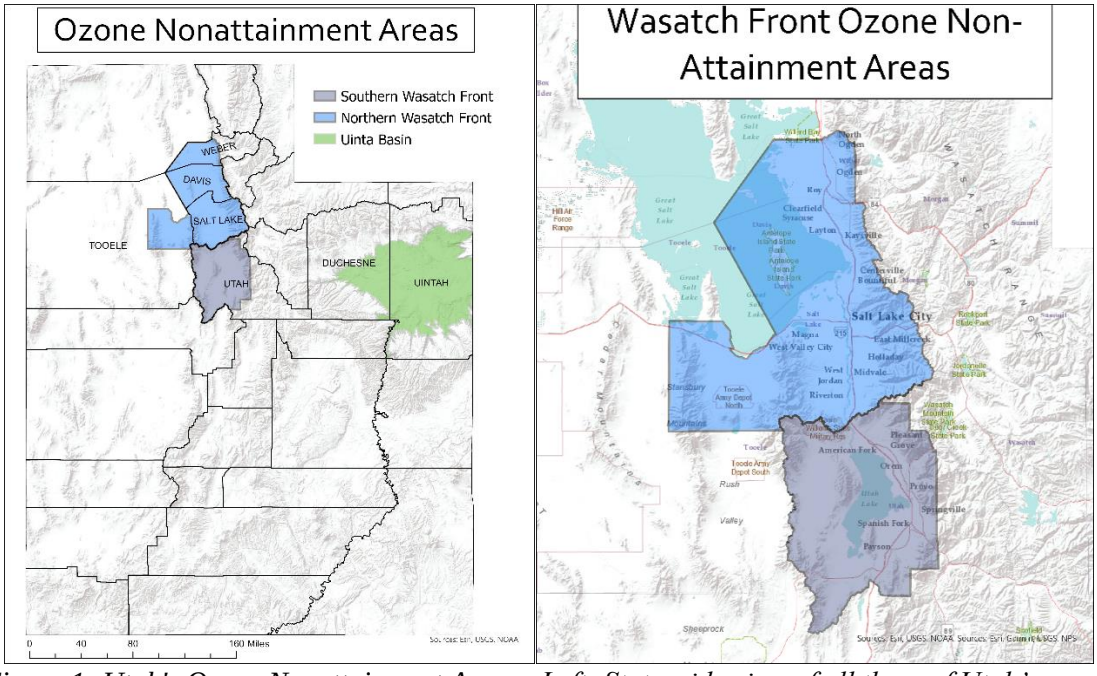

Figure 1: Utah's Ozone Nonattainment Areas. Left: State wide view of all three of Utah's ozone Nonattainment areas. Right: Wasatch Front ozone Nonattainment areas.

Current monitoring data indicates that the NWF NAA's design value (DV) for data collected from 2018 – 2020 is 77 ppb and thus the area will not attain the standard by the August 3, 2021 attainment date (Table 1). As a result, it is anticipated that the NWF NAA will be reclassified to moderate status. In preparation for this reclassification, and to meet the needs of the regulatory requirements of a moderate NAA State Implementation Plan (SIP), the Utah Division of Air Quality (UDAQ) will be required to provide further

inventory information. UDAQ has recently prepared such inventories for the NWF for both $PM_{2.5}$ SIPs and maintenance plans. Despite these previously constructed inventories, with the added complexities of modeling photochemical ozone and additional SIP requirements associated with redesignation, it seems appropriate to have an Inventory Preparation Plan (IPP) to help guide the inventory development for the potential necessary regulatory requirements for a moderate classification in the NWF NAA.

Table 1: Ozone values from sites in NWF NAA from 2018 - 2020. Values calculated in accordance with 40 CFR §50 Appendix U.

Ozone Summary Table						
Site ID	Site Name	County	Annual 4th Highest			Three Year Average
			2018	2019	2020	2018-2020
49-057-1003	Harrisville	Weber	77	64	74	71
49-011-0004	Bountiful	Davis	80	73	80	77
49-035-2005	Coperview	Salt Lake	79	67	75	73
49-035-3006	Hawthorne	Salt Lake	74	73	75	74
49-035-3010	Rose Park	Salt Lake	80	71	80	77
49-035-3013	Herriman	Salt Lake	78	70	73	73
49-045-0004	Erda	Tooele	74	65	70	69
49-035-4001	Lindon	Utah	79	62	68	69
49-049-5010	Spanish Fork	Utah	73	66	70	69

2. SCOPE OF WORK

2.1 Geographic Area; Nonattainment Areas and Modeling Domain

The inventories developed will support the regulatory requirements for a moderate NAA in the NWF and will require a high degree of accuracy. A 4km modeling domain will cover the entire state of Utah and surrounding counties in neighboring states. A nested 1.3 km modeling domain will encompass an area slightly greater than the Wasatch Front to account for canyon outflows from the surrounding mountain ranges and the effects of the Great Salt Lake (Figure 2).

Figure 2: Utah's modeling domains for the Northern Wasatch Front.

UDAQ will compile information directly by source category, including Point Sources, Area Sources, and Mobile Sources (both on-road and non-road). To the best of UDAQ's ability, the inventories compiled for all counties within the NWF NAA will include all sources, including those not under UDAQ regulatory authority. This will be achieved though the cooperation with the local metropolitan planning organizations. For outlying areas in other states, the UDAQ will use National Emissions Inventory (NEI) data distributed by EPA. For partial counties within the modeling domain, emissions will be spatially distributed to the grid cells within the modeling domain.

2.2 Pollutants to be Inventoried

Ozone is not directly emitted into the atmosphere, but instead is created through reactions of precursor pollutants, including oxides of nitrogen (NOx) and Volatile Organic Compounds (VOCs) in the presence of sunlight. These precursors will be included in the inventories. The inventories will also include the pollutants carbon monoxide, oxides of sulfur, fine particulate matter and coarse particulate matter (CO, SOx, $PM_{2.5}$, and PM_{10} respectively) as these are importance pollutants when modeling photochemical ozone.

Residential wood combustion will not be considered in the modeling demonstration. Given that this source is not a significant emitters of ozone precursors when compared to more predominant sources in the nonattainment area and is not seasonally relevant to the NWF, emissions from residential wood combustion is not expected to have a significant impact on ozone formation.

2.2.1 Fires and Biogenic Sources

Emissions from wildland and prescribed fires, and biogenic sources, which are dependent on meteorological conditions, are accounted for during the modeling phase and are not traditionally inventoried. Emissions from wild fires are accounted for using the Blue-Sky Framework in the Sparse Matrix Operator Kerner Emissions (SMOKE) model, while biogenics are accounted for with the Biogenic Emission Inventory System (BEIS). Forests are significant sources of VOC's, and the burning of forest material is a source of ozone precursors and particulate matter. These source categories are crucial to include in any ozone modeling demonstration.

Fire data, including location, acres burned, dates, etc., in the modeling platform are sourced from several national databases (EPA 2016 platform TSD, pages 83-92). Biogenic sources are based on an updated version of the USDA-USFS Forest Inventory and Analysis (FIA) vegetation speciation-based data from 2001 to 2014.

3. Baseline, Model Validation and Projection Years for Inventories

It was determined to use a period from June 15th – July 31st of 2017 to perform model validation for the NWF NAA. During this period of time multiple ozone exceedance events were observed at the controlling monitor making this an ideal period for modeling. The timeframe and meteorological conditions of this episode will be used for modeling the baseline year of 2017, as well as the projection year 2023. Projection year inventories will be modeled following EPA guidance. The projected year inventory of 2023 was selected as it is the year prior to the attainment date of August, 3rd 2024. For this inventory the full month of July was selected as it serves as the peak of the NWF ozone season.

Temporal allocation of the annual point source inventories to other time scales will be made while preprocessing the inventories for modeling. These adjustments are based on profiles contained in the SMOKE emissions preprocessor. Reports generated by SMOKE for 24-hr averaged periods will be made available for review. In addition, on- and non-road emissions will be reported in SMOKE format by Source Category Code (SCC).

3.1 Baseline and Model Validation Inventory

The year 2017 has been selected to represent the baseline emissions inventory (EI) and the Model Validation inventory for the NWF SIP. As recommended in the implementation rule for the 2015 ozone standard, 2017 coincides with the most recent tri-annual inventory that has been compiled by the UDAQ. The UDAQ has developed and submitted a baseline in accordance with 40 CFR 51.1315 which requires states to submit a baseline inventory two years after a nonattainment designation. The baseline inventory means a comprehensive, accurate, current inventory of actual emissions from sources of VOCs and NO_X emitted within the boundaries of the NAA as required by CAA section 182(a)(1). The inventory is compiled in ozone season day emissions, which is an average day's emissions for a typical ozone season work weekday. This is an average summer day for the NWF. This inventory of actual emissions will be the basis for any projections made to represent future years.

Utah typically tabulates emissions from area and mobile sources on a county-by-county basis. The raw data is entered into SMOKE such that it is assigned a geographic location (grid cell). To report emissions specific to the NAAs, Utah will crop gridded emissions with a Geographic Information System (GIS) tool using polygons representing the bounds of the NAA. The county-by-county data will be included in the SIP submittal as part of the Technical Support Document. Compilation of the base year inventory and model validation inventory throughout the modeling domain may be summarized as follows:

- Point source emissions will be represented as the actual emissions from the 2017 tri-annual inventory. Point sources will be those with actual emissions of 100 tpy or more for NOx and/or VOC located within the NAA.
- Area source emissions will be represented by utilizing data submitted for the base year 2017 tri-annual inventory.
- On-road mobile source emissions will be calculated utilizing MOVES3 (Motor Vehicle Emissions Simulator) with an adjustment for the 2017 gasoline sulfur levels and represented as a 2017 county level inventory covering an average summer weekday, Saturday, and Sunday. Emission estimates will be based on 24-hour average 2017 July 1-31 meteorological profiles.
- Oil and Gas point and area source calculations are described in detail in Section 6 below.
- Oil and Gas Off-Road Mobile and Non-road equipment emissions will be calculated utilizing MOVES3 with an adjustment for 2017 gasoline sulfur levels and represented as a 2017 county level inventory covering an average summer weekday. Emission estimates will be based on 24-hour average 2017 July 1-31 meteorological profiles.
- Non-road Mobile source emissions will be calculated using the non-road MOVES3 with an adjustment for 2017 gasoline sulfur level in Utah; Emission estimates will be based on 24-hour average 2017 July 1-31 meteorological profiles.
- Airport Ground Support Equipment (GSE) are calculated via the Federal Aviation Administration's Aviation Environmental Design Tool (AEDT).
- 2017 NEI Airports data from EPA is used as 2017 airport baseline inventory. UDAQ will apportion the aircraft inventory by monthly activity from Bureau of Transportation Statistics T-100 dataset.
- 2017 NEI rail yard estimates are compiled by the Eastern Regional Technical Advisory Committee (ERTAC) which was overwritten by UDAQ's submittal. UDAQ will apportion the rail yard inventory by monthly activity from Association of American Railroads (AAR) dataset.

3.2 Projection Year Inventories

The projection year emissions inventory will be prepared for 2023 as this is the year prior to the presumed attainment date of August 3, 2024. These will be a projection of emissions reflecting changes due to growth and control.

In the case of each of these projections, emissions will be compiled as follows:

- Point source emissions will be forecasted from the 2017 tri-annual inventory. Individual sources will be adjusted based on projected growth as well as RACT analysis that will be performed as part of the moderate SIP requirements.
- Area sources will be forecasted from the 2017 Tri-annual EI using the appropriate growth factors from various projection sources (see section IV. C. Projection of Area Source Emissions) and factoring in any controls identified during the RACM analysis that will be performed as part of the moderate SIP process at the appropriate points in time.
- On-road Mobile source emissions will be calculated using the on-road MOVES3 with forecasted travel inputs provided by UDOT covering three separate episode days: weekday, Saturday, Sunday; Emission estimates will be based on 24-hour average 2017 July 1-31 meteorological profiles
- Oil and Gas point and area source calculations are described in detail in Section 6 below.
- Oil and gas off-road mobile and non-road equipment emissions will be calculated using emission factors generated by the on & off-road portions of the MOVES3 emissions model. Forecasted production activity will be provided by the Western Energy Alliance and the Utah Petroleum Association. Emission estimates will be based on 24-hour average 2017 July 1-31 meteorological profiles

- Non-road Mobile source emissions will be calculated using the non-road MOVES3 (Motor Vehicle Emissions Simulator) emissions model with an adjustment for gasoline sulfur level in Utah for future year; Emission estimates will be based on 24-hour average 2017 July 1-31 meteorological profiles
- Airports emissions will be projected to 2023 mostly using 2018 Terminal Area Forecast (TAF) data available from the Federal Aviation Administration. Projection factors were computed using the ratio of the itinerant (ITN) data between the base and projection year.
- Rail emissions were computed for future years based on 2023 future year fuel use values which were based on the Energy Information Administration's 2018 Annual Energy Outlook (AEO) freight rail energy use growth rate projections for 2016 thru 2028 and emission factors based on historic emissions trends that reflect the rate of market penetration of new locomotive engines.

3.3 Time Averaging Periods

Emissions will be calculated as annual emissions with the exception of:

- On-road mobile source inventories will be calculated as Tons Per Day for an average summer weekday, Saturday or Sunday.
- Non-road mobile source emissions of miscellaneous non-road vehicles and equipment from MOVES3 will be calculated Tons Per Day for an average weekday and weekend. Aircraft and rail emission will be calculated as Tons Per Year for the month.
- Point and Area Source emissions are adjusted to reflect activity during the summer periods. For example, each point source reports a level of operation corresponding to each month of the year.
- Oil and Gas Off-Road Mobile and Non-road equipment emissions will be calculated as Tons Per Day for an average summer ozone season weekday.

Emissions will be extracted from SMOKE and reported in time averaged units of "tons-per-day". Each projection of the emissions inventory will be modeled with meteorology reflecting the actual episode used to validate the air quality model (this episode spans the full month of July). Therefore, average-season-day emissions in the SIP refers to tons-per-day typical of an NWF summer day.

4. POINT SOURCE EMISSION INVENTORY DATA

4.1 Threshold Values for Point Sources in Tons per Year – Baseline Inventory

Staff used the definition of a Type B Source under Title V of the Clean Air Act (as specified in 40 CFR Appendix A to Subpart A of Part 51) to define point source thresholds in the NAA. The provided inventory includes all Type B sources of NO_X, VOC, and CO in the NAA. This definition includes all facilities with the potential to emit 100 tons per year or more of VOC or NOx as well as any facilities with the potential to emit 1000 tons per year or more of CO. Emissions from sources under the Type B thresholds are not included in the area source baseline inventory, as they do not have large enough potential emissions to qualify for the point source inventory.

4.2 Data Collection Method

UDAQ has improved emissions inventory data management with the implementation of the State and Local Emissions Inventory System (SLEIS). This system has established an online emissions inventory system, whereby point sources can submit their air emissions inventories to UDAQ. SLEIS includes built-in calculation capabilities which simplify the process and reduce the workload for point sources. SLEIS also contains extensive Quality Assurance and Quality Control (QA/QC) tools which guide point sources as they submit their data, thereby greatly reducing oversight required by UDAQ staff. The 2017 triannual

emissions inventory was submitted to UDAQ by point sources using the SLEIS online system. The submitted emissions inventories were thoroughly reviewed using additional QA/QC by UDAQ staff before being finalized. The QA/QC contained in the SLEIS online system along with the review performed by UDAQ staff greatly surpasses EPA guidance requiring 10% QA/QC as the minimum criteria necessary for a SIP inventory.

4.2.1 Model Validation Inventory

2017 Episode: actual inventories submitted to DAQ through SLEIS were used.

4.2.2 Baseline Inventory

The 2017 point source emissions inventory was used for the baseline emissions inventory for the SIP. Point source emissions were represented as the actual emissions from the 2017 triannual emissions inventory which coincides with the most recent triannual inventory that has been compiled and reviewed by UDAQ. This inventory will predominantly be the basis for future year projections as well.

4.2.3 Projection to Future Years

Point source emissions in the ozone NAAs and affecting the ozone NAAs will be grown on a case-by-case basis for each source and represented in the ozone maintenance SIP workbooks for 2023. Most workbooks will use 2017 emissions data from SLEIS for the base year, though in rare cases, data from other years will be used. Circumstances warranting a different base year for projections include: no data for 2017, major changes in reporting methodology from 2017, and partial or total shutdowns in 2017. These workbooks will provide a depiction of the required emissions and data for each source. They will be used for projecting emissions to future years and to display any control technologies that will be applied. Thorough description of the growth for each source in the ozone SIP will be given in the technical support document of the maintenance plan. Data from Kem C. Gardner Policy Institute County Projections will be used for projecting emissions for all facilities.

4.2.4 Depiction of Control Technologies

After point source emissions have been projected to future years, control measures resulting from reasonable and best available control technologies will be applied to each source and resulting emissions represented in the Ozone SIP workbooks.

4.2.5 Correction for Potential Double Counting of Emissions

Double counting occurs when emissions from a source are included in both the area source and point source emissions. To avoid this, known point source emissions are subtracted from area emissions. For example, after the total natural gas consumption is calculated from utility records, the known point source consumption will be subtracted from the area source natural gas use total. The difference is the area source contribution and the contribution of missed or unidentified point sources.

5. AREA SOURCE INVENTORY DATA COLLECTION

5.1 Area Emission Inventory Source Categories

Area Sources are typically smaller, yet pervasive sources that do not qualify as point sources under the relevant emissions cutoffs. Area sources encompass more widespread sources that may be abundant, but that, individually, release small amounts of a given pollutant. These are sources for which emissions are estimated as a group rather than individually. Examples typically include dry cleaners, residential wood heating, auto body painting, and consumer solvent use. With the exception of certain oil and gas industry

sources, area sources generally are not required to submit individual emissions estimates, and instead are reported as county totals. Oil and gas industry inventory methods are detailed in a separate section of this plan and will not be mentioned here.
Area sources cover broad groups of operations or activities that produce emissions, such as:

1. Commercial and consumer solvent usage;
2. Stationary fuel combustion;
3. Material storage and distribution;
4. Waste treatment and disposal;
5. Miscellaneous industrial manufacturing operations;
6. Miscellaneous sources (agricultural/forest burning, structure fires, mining, and construction); and
7. Fuel distribution

Each of these broad groups contains a number of more specific groups or categories that share similar emission processes and emission estimation methods.

5.2 Method of Calculation of Area Source Categories

Area source calculation methods are consistent with Utah's methods for reporting the EPA's tri-annual National Emissions Inventory. Area source emissions are calculated based on activity data, which is gathered from sources such as Departments of Transportation, State Tax Commissions, State Data Centers, State Offices of Planning and Budget, State Energy Commissions, federal agencies such as the U.S. Census Bureau, county and local government agencies, airports, natural gas suppliers, and local trade associations. These data include population, employment, vehicle miles travelled, fuel usage, animal, crop, and other estimates. Area source calculations are often based on combining these activity data with emission factors. Emission factors were also gathered from similar sources, mostly EPA documents. A list of the individual data tables and sources of the data used in the calculation processes is included in the supplied Excel input workbook and RStudio script, and is available upon request. This workbook contains annual activity data by county, and details emissions summations by category from database queries or applicable EPA/NOMAD (Nonpoint Methods Advisory group) tool outputs and additional emissions estimates ("gap filling").
Area sources were adjusted for potential overlaps and double counts with point sources. Adjusted categories include bakeries, mining and quarrying, fuel combustion, degreasing solvents, publicly owned treatment works (POTW), and municipal landfills. After being compiled, area source inventory data are processed through SMOKE which adjusts the data for the desired episode and applies additional relevant controls. Some categories that are included in the workbook were not used in the SMOKE process because emissions from these categories do not occur within the SIP boundary or during the time period of interest.

5.3 Projection of Area Source Emissions

The 2017 inventory was drawn from Utah's 2017 tri-annual inventory. Data for 2023 was based off of 2017 data and projected forward. Projection methods were consistent with methods used in past Utah SIPs. Emission projections were based off of activity data, similar to their baseline estimates. Depending on the SCC, emissions were projected to scale with population, manufacturing, agricultural, employment data, Energy Information Agency energy use projections vehicle miles traveled, and other similar data sources.

6. OIL AND GAS INVENTORY DATA COLLECTION

6.1 Baseline Year Inventory and Model Validation Inventories 2017

The inventory data collection process began with a letter that was sent to all oil and gas operators with instructions on how to submit their emissions inventory. Webinars were also provided to instruct the operators on how to fill out the workbook. Operators would download the workbook from our DEQ website and email it back when finished (https://deq.utah.gov/air-quality/2017-statewide-oil-gas-emissions-inventory). Once the workbook was received a quality control check was performed for each submission. Any questions or discrepancies were worked out directly with the operator. Once workbooks passed the quality control check they were put into a SQL database to compile all the emissions data into one place. These emission categories were collected via operator workbook.

- Dehydrators
- Dehydrator Combustors
- Fugitives
- Pneumatic Controllers
- Pneumatic Pumps
- RICE & Engines
- Separators & Heaters
- Tanks (Condensate)
- Tanks (Oil)
- Tanks (Water)
- Tank Combustors
- Truck Loading
- Well Completions (Drilling)
- Well Completions (Venting/Flaring)
- Centrifuges
- Solid Waste Disposal
- Produced Water

The second part of the oil and gas inventory collection is the gap filling. Gap filling is based off emission estimates from data outside of what operators reported in their workbooks. These emission categories include.

- Control Effectiveness Adjustment (Water Tanks)
- Control Effectiveness Adjustment (Condensate Tanks)
- Control Effectiveness Adjustment (Oil Tanks)
- Midstream Vent (maintenance, startup/shutdown, malfunction)
- Pipeline Leaks
- Greenhouse Gas Emissions Reporting Program Additions (Gap Filling)
- Gas Well Venting (Blowdowns)
- Pipeline Blowdowns and Pigging
- EPA/NOMAD Oil and Gas Tool
- Associated Gas Venting
- CBM Dewatering Pumps
- CBM Well Venting (Blowdowns)
- Mud Degassing

The 2017 Oil and Gas Emission Inventory that was submitted as part of the marginal 2015 ozone NAAQS requirement was amended with amended operator submissions and additional data collected by UDAQ and EPA via the Uinta Basin Composition Study and additional evaporation pond samples that were collected via UDAQ permit requirements and an EPA sampling program. These updates to the 2017 Oil and Gas Emission Inventory are documented in two white papers, "Uinta Basin VOC Composition Study Impacts on the 2017 Oil and Gas Emission Inventory" and "Produced Waste Disposal Facility Emission Factors & Their Impact on the 2017 Oil and Gas Emissions Inventory".

6.2 Projection Year Inventory 2023

Forecasting the oil and gas production was done using U.S. Energy Information Administration (EIA) data. This data was narrowed down to the Rocky Mountain region consisting of Colorado, Idaho, Montana, Utah, and Wyoming. The 2017 historical production was compared to the 2023 forecasted numbers from the EIA AEO 2021 report. Forecasting factors for water production and well completions were computed by averaging the previous 4 years (2017-2020). The previous 4-year data was based off of UDOGM records for the Uinta Basin (Uintah and Duchesne Counties) (Table 2). Since the overwhelming majority of oil and gas development in Utah is located with in the Uintah Basin and little resides within the NWF NAA, these emissions are expected to have a minimal impact on ozone formation but have been included in an effort to best account for all emissions.

Table 2: Percent Change Oil and Gas Inventory between baseline year and projected year inventories

Percent Change from 2017 to 2023			
	2017	2023	% Change
Oil Production (Millions of Barrels Per Day)	0.7330	0.9346	27.50%
Gas Production (Trillion Cubic Feet)	3.7948	3.8218	0.71%
Water Production	79,588,236	78,235,588	-1.70%
Well Completions	161	140	-12.89%

7. ON-ROAD MOBILE INVENTORY DATA COLLECTION

The following acronyms are used throughout the following section:

- AADT – Average Annual Daily Traffic
- CMPO - Cache Metropolitan Planning Organization
- ECPM – Elemental Carbon Particulate Matter
- EPA – Environmental Protection Agency
- FHWA - Federal Highway Administration
- FTA - Federal Transit Administration
- HPMS – Highway Performance Monitoring System
- MAG - Mountainland Association of Government
- MOVEs - Motor Vehicle Emissions Simulator
- MPO - Metropolitan Planning Organization
- OTAQ – EPA's Office of Transportation and Air Quality

- TSD – Technical Support Document
- UDAQ - Utah Division of Air Quality
- UDMV – Utah Department of Motor Vehicles
- UDOT - Utah Department of Transportation
- UTA - Utah Transit Authority
- WFRC - Wasatch Front Regional Council

On-road mobile source emissions include vehicles that travel on paved roads that produce exhaust, evaporative, and road dust emissions. The Motor Vehicle Emissions Simulator (MOVES3) is the EPA designated model for on-road mobile exhaust and evaporative emissions. The on-road mobile inventory will be compiled using MOVES3 according to the document "MOVES3 Technical Guidance: Using MOVES to Prepare Emissions Inventories for State Implementation Plans and Transportation Conformity" November 2020. The pollutants to be inventoried include Ammonia (NH3), Carbon Monoxide (CO), Composite Non-ECPM, Elemental Carbon, water vapor (H_2O), Non-Methane Hydrocarbons, Oxides of Nitrogen, Primary Exhaust $PM_{2.5}$, Sulfate Particulate, Total Gaseous Hydrocarbons, and Volatile Organic Compounds.

7.1 Agency Responsibilities

The following agencies are responsible for on-road mobile source emissions within the NWF NAA:

- Wasatch Front Regional Council (WFRC): Box Elder, Davis, Salt Lake, Tooele, and Weber Counties
- Mountainland Association of Governments (MAG): Utah County
- Utah Division of Air Quality: 20 rural attainment counties within Utah including Cache County

7.2 MOVES Methodology

UDAQ will use the MOVES3 model to create countywide emissions inventories for daily on-road mobile emissions estimates.

7.3 Baseline and Projection

The baseline year and projection year inventories will be compiled through the Interagency Consultation Team following consultation procedures detailed in Section XII of the Utah Transportation Conformity Consultation SIP. The interagency consultation team is primarily used to discuss and decide what MOVES modeling inputs should be used with the SIP modeling domain. The interagency consultation team includes representatives from EPA, Federal Highway Administration\Federal Transit Authority, Utah Department of Transportation, Utah Transit Authority, Wasatch Front Regional Council (WFRC), Mountainland Association of Governments (MAG), Cache MPO, and Utah Division of Air Quality.
On-road mobile source baseline and projection emission inventories will be prepared for an average ozone season weekday, Saturday, Sunday based on average hourly temperatures and relative humidity from the 2017 July 1-31 episode. Vehicle Miles Traveled (VMT) will be measured as an average ozone season day weekday, Saturday, and Sunday.
UDAQ will provide inventories for the remaining 20 rural attainment counties in Utah. The CMPO, MAG, and WFRC MPOs will provide the on-road mobile inventories for the 7 remaining urbanized counties. The baseline and projection TSD will indicate what specific local planning assumptions were used.
Age Distribution– UDAQ will use UDMV data to construct county specific age distribution values, light duty vehicle types <= 14,000 GVWR.
Average Speeds and Vehicle Miles of Travel –WFRC and MAG will supply travel demand model speeds and VMT for the NWF and for the surrounding rural areas.

The 2017 baseline inventories will use speed profiles from 2019.
The 2023 future year inventories will use speed profiles from 2024.
Fuel Data –EPA Office of Transportation and Air Quality (OTAQ) will provide gasoline sulfur levels for 2013 at 31.8 parts per million (ppm) and 2017 at 20.9 ppm. The gasoline sulfur data reflects more accurate gasoline produced by the five refineries along the Wasatch Front and the Sinclair, Wyoming refinery. MOVES3 default fuel parameters will be used for projection inventory for 2023. The default gasoline sulfur level for 2023 is set at 10 parts per million.
Meteorology – The UDAQ Technical Analysis Section provided metrological conditions from the MesoWest archives. Meso West (mesowest.utah.edu) is a database of current and archived meteorological data from weather stations in the United States maintained by the University of Utah. 2017 July 1-31. Meteorological data from the airport in Salt Lake City, Utah (KSLC) was acquired from the Meso West Archives. The meteorological data is an average temperature and relative humidity for the full month of July, from July 1-31, 2017.
Road Type Distribution and Vehicle Mix – UDAQ and UDOT will construct county specific VMT travel fractions for FHWA vehicle classes grouped by Gross Vehicle Weight Rating (GVWR) ranges provided by the UDOT Division of Systems and Planning and Programming.
Conformity Budgets – The motor vehicle emissions budget (MVEB) will be established for the last year of each maintenance plan for the year 2023 for NOx, and VOC emissions. EPA's conformity regulation (40 CFR 93.118(b)(2)) requires that the last year of the maintenance plan to be used as a MVEB.

8. NON-ROAD MOBILE INVENTORY DATA COLLECTION

8.1 Agency Responsibilities

UDAQ is responsible for developing non-road equipment operating within the NWF NAA. Non-road mobile sources include emissions from the following sectors:

- EPA NONROAD Model (miscellaneous non-road engines)
- Aircraft emissions
- Airport Ground Support Equipment
- Diesel Locomotives

8.2 Methodology

UDAQ will use the non-road portion of MOVES3 model to create countywide emissions inventories for daily non-road mobile emissions estimates. Episode emissions were computed for a weekday and a weekend day. Output units were grams per weekday or grams per weekend day. Then emissions were converted from daily to annually ton-per-year using the following equation:

(5*Wkdy + 2*Wknd)/7 = Daily Emissions * 365.25 = Tons per Year

Commercial marine equipment, locomotive emissions from rail yards and aircraft GSE are not modeled by MOVES. Although MOVES-Nonroad estimates emissions from Airport GSE, the results are not used in the Nonroad emission. Airport GSE are calculated via the Federal Aviation Administration's Aviation Environmental Design Tool (AEDT).

Railway maintenance emissions (SCC 2285002015) are included in the nonroad emission. Rail yard emissions are associated with the operation of switcher engines at each yard. It is compiled by the Eastern Regional Technical Advisory Committee (ERTAC). UT submittal overwritten 2017ERTAC values

Non-road Oil field pieces of equipment are accounted by MOVES3 for every county within the State of Utah except for Duchesne and Uintah counties. The inventories for these counties have

separate inventories that account for oil and gas construction and development processes and off road mobile source operating within the oil fields.

2017 NEI Emissions for aircraft operations include commercial, general aviation, air taxis and military aircraft, auxiliary power units (APU) and ground support equipment (GSE) computed by the EPA. Methods include the use of the Federal Aviation Administration's (FAA's) Emissions and Aviation Environmental Design Tool (AEDT).

2017 NEI rail yard estimates are compiled by the Eastern Regional Technical Advisory Committee (ERTAC) for most rail yards in the US. Yard emissions are associated with the operation of switcher engines at each yard. Commuter rail emissions from UTA FrontRunner are also included in the inventory.

8.3 Non-Road MOVES3 Inputs

MOVES3 uses county database managers (CDBs) to provide detailed local information for developing nonroad emissions. Each CDB contains the non-road mobile data tables for each county in the state for fuel and meteorology.
Fuel Data –EPA Office of Transportation and Air Quality (OTAQ) will provide gasoline sulfur levels for 2013 at 31.8 parts per million (ppm) and 2017 at 20.9 ppm. The gasoline sulfur data reflects more accurate gasoline produced by the five refineries along the Wasatch Front and the Sinclair, Wyoming refinery. MOVES3 default fuel parameters will be used for projection inventory for 2023. The default gasoline sulfur level for 2023 is set at 10 parts per million.
Meteorology Data – The UDAQ Technical Analysis Section provided metrological conditions from the MesoWest archives. Meso West (mesowest.utah.edu) is a database of current and archived meteorological data from weather stations in the United States maintained by the University of Utah. 2017 July 1-31. Meteorological data from the airport in Salt Lake City, Utah (KSLC) was acquired from the Meso West Archives. The meteorological data is an average temperature and relative humidity for the month of July, 2017.

9. OIL AND GAS OFF-ROAD MOBILE AND NON-ROAD EQUIPMENT

9.1 Agency Responsibilities

UDAQ is responsible for developing off-road mobile and non-road well pad construction equipment operating within the oil and gas fields in the Uintah Basin NAA. The pollutants to be inventoried include Ammonia (NH3), Carbon Monoxide (CO), Composite Non-ECPM, Elemental Carbon, H2O, Non-Methane Hydrocarbons, Oxides of Nitrogen, Primary Exhaust PM2.5, Sulfate Particulate, Total Gaseous Hydrocarbons, and Volatile Organic Compounds.

9.2 Methodology

UDAQ will use the on-road and project level modeling portions of MOVES3 model for the off-road inventory occurring within the oil and gas fields within the Uintah Basin NAA. The project scale inventory mode will be used to create running and idle emission factor estimates. The speeds and trip lengths will be based in the 2011 Environ Study (Environ Oil and Gas Mobile Sources Pilot Study; Prepared for: U.S. Environmental Protection Agency Work Assignment 4-08. July 2011). Production traffic trips and idle time activities for Heavy Duty Diesel Trucks have been replaced with local data. The new trip activity is based on the product produced (oil, water, condensate) and divided by the production truck load out volume (280 barrels (bbl) per oil truck, 130 bbl per water/condensate truck). The production numbers are for 2013 and 2017 provided by the Utah Division of Oil and Gas, and Mining. Future production numbers will be provided the Utah Division of Oil and Gas, and Mining.

UDAQ will use the non-road modeling portions of MOVES3 model for the well pad construction equipment operating within the Uintah Basin NAA. Non-road equipment activity will be provided by: March 2016 Ramboll Environ Colorado Air Resource Management Modeling Study (CARMMS) with updated Mancos Shale Modeling CARMMS 1.5 Final Report: appendix C-2 and C-4. Non-Road default emission factors were developed for these pieces of equipment using the EPA approved MOVES3 Non-Road model. MySQL was used to select pieces of equipment by county and Source Classification Code (SCC) for equipment that equaled 300 Horse Power (HP). The emission factors developed from MOVES are in grams per operating hour by SCC by HP.

9.3 Non-Road MOVES3 Inputs

Age Distribution– UDAQ will use UDMV data to construct county specific age distribution values, light duty vehicle types <= 14,000 GVWR.
Fuel Data –EPA Office of Transportation and Air Quality (OTAQ) will provide gasoline sulfur levels for 2013 at 31.8 parts per million (ppm) and 2017 at 20.9 ppm. The gasoline sulfur data reflects more accurate gasoline produced by the five refineries along the Wasatch Front and the Sinclair, Wyoming refinery. MOVES 20143 default fuel parameters will be used for projection inventory for 2023. The default gasoline sulfur level for 2023 is set at 10 parts per million.
Meteorology – The UDAQ Technical Analysis Section provided metrological conditions from the MesoWest archives. Meso West (mesowest.utah.edu) is a database of current and archived meteorological data from weather stations in the United States maintained by the University of Utah. Meteorological data from the airport in Salt Lake City, Utah (KSLC) was acquired from the Meso West Archives. The meteorological data is an average temperature and relative humidity for the full month of July, from July 1-31, 2017.

10. ROLES AND RESPONSIBILITIES

UDAQ, EPA and the Ute Tribe have coordinated successfully on collecting data from oil and gas area sources within the state of Utah that aren't regulated by either agency. As other area sources are inventoried via emission factors and growth data, it is assumed those emission values are county wide and include all jurisdictional sources. Mobile sources, on-road and non-road, are modeled on a county wide basis and these emission inventories will be provided by UDAQ, with the cooperation and coordination with EPA and UDOT and the MPO's outlined in section 7.1.

UDAQ is expecting that point sources that are not regulated by UDAQ will be verified by the regulating agency, EPA, and that those point source emissions are captured within the baseline inventory that will be used for RFP and attainment modeling. UDAQ is also expecting that projected inventories will be provided by EPA for these point sources and any RACT assumptions will be provided for the proper development of the SIP.